

Remifentanil Analgesia and its applications in the Management of Parturient labor pain

By: Abigail Evans, BSN, RN SRNA & Tessa Fajardo, BSN, RN, SRNA

Project Mentor: Robert Wade, MSNA, CRNA: JLR Medical Group

Project Chair: Manuel Tolosa, DNAP, CRNA

Nurse Anesthesia Program, Adventist University of Health Sciences

Abstract

- The purpose of this research study was to evaluate student registered nurse anesthetists (SRNA) at Adventist University of Health Sciences on their knowledge of Remifentanil as an analgesic for labor pain in the parturient patient.
- As more obstetric disorders are encountered that prohibit placement of an epidural, student registered nurse anesthetists need to be educated and informed on alternative labor pain analgesics.
- After the literature review was completed, a PowerPoint presentation was assembled and presented to 26 SRNAs during their class that focused on the obstetric population and anesthesia management.
- Data were then analyzed using the paired sample t test, which yielded statistical significance with a P value <0.05.

Characteristics of Remifentanil

- Potent, ultra short-acting synthetic opioid analgesic
- Belongs to the anilidopiperidine class of synthetic opioid.
- Pregnancy Risk: Category C (Risk cannot be ruled out)
- Strong affinity to mu-1 opioid receptors and a weaker affinity to delta and kappa opioid receptors.**
- Low volume of distribution
- Peak effect: 2 minutes
- Duration of Action: 20 minutes
- High Clearance rate: approx. 40ml/kg/min (easier to titrate)

Pharmacokinetics

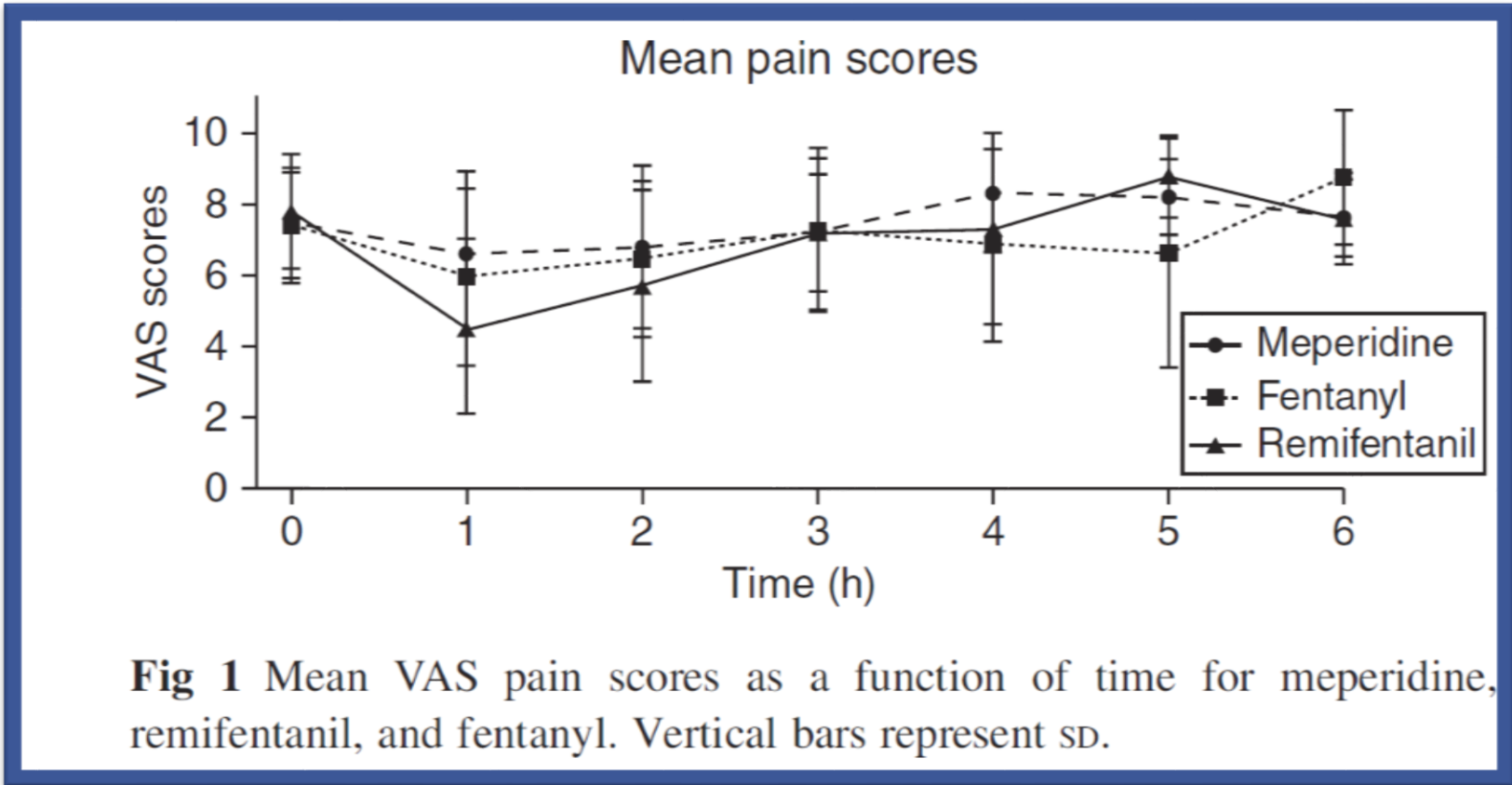
- Unlike other opioids, Remifentanil has a propanoic acid-methyl ester linkage → undergoes rapid hydrolysis by non-specific **plasma/tissue esterases**.
- Normal drug action in patients with atypical cholinesterase.
- 70% bound to plasma proteins, with 2/3 binding to alpha-1-acid-glycoprotein
- Metabolized to Carboxyl acid → **46,000x less potent** than the original form
- Excretion depends on renal clearance, but metabolites are mostly inactive → so not influenced by hepatic or renal failure.

Problem

- According to Celewicz (2015), since the mid 1980s the implementation of epidurals has been considered the gold standard for controlling labor pain.
- However, not every woman is able to receive the benefits of an epidural; therefore, an alternative pain management therapy is needed.
- After a thorough review of literature was completed, Remifentanil proves to be beneficial in providing labor pain relief in parturients who are unable to receive epidurals.
- Because this use of Remifentanil within the parturient population is new to American healthcare, there is a need for the education among SRNAs and healthcare providers as a whole.

Review of Literature

- Maternal Satisfaction**
 - Many of the studies demonstrated that majority of mothers (62%-88%) had HIGH satisfaction scores after using Remifentanil (Devabhakthuni, 2013).
- Concerns for Respiratory Depression**
 - In a study by Stocki et al. (2014), oxygen saturation levels were closely monitored during all apnea events. Oxygen saturation levels remained above 94% throughout Remifentanil PCA infusions with 59.3% of the 27 apnea events recorded and only 22.2% of apnea events resulted in oxygen saturation levels less than 94% (Stocki et al., 2014).
- Drug Effects on Neonate**
 - According to Tveit et al. (2013), though the Remifentanil dose in the fetus is 50% of the maternal concentration, there is still concerns for neonatal safety, especially due to respiratory depression. This study suggested that more studies with larger patient populations were needed for a definite conclusion
- Ultiva vs. Other IV analgesics**
 - Though both Fentanyl and Remifentanil effectively decreased pain scores in parturients, more neonates in the Fentanyl group (59%) required resuscitation compared to neonates in the Remifentanil group (25%).



Douma, M., Verwey, R., Kam-Endtz, C., Linden, P., & Stienstra, R. (2011). Obstetric analgesia: a comparison of patient-controlled meperidine, remifentanil, and fentanyl in labour. *British Journal of Anaesthesia*, 104(2), 209215. doi:10.1093/bja/aep359

Results

- The results of the pre-test scores showed that teaching was needed in regards to the purpose of Remifentanil PCA's in the parturient population. Though the pre-test average score was 52.93%, there was still need for much knowledge-based improvement over this subject.
- The post-test results showed that there was an increase in average in regards to pre and post-test scores.
- This dramatic increase concluded that the students retained knowledge from the presentation and was able to answer questions regarding Remifentanil whereas prior to the PowerPoint presentation, there was a knowledge deficit.
- The obtained t value of -9.551 was associated with a p value of less than the conventional .05 level of confidence. Therefore, it can be concluded that the average scores increased significantly between pre-test and post-test administrations.

Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Pre-Test - Post-Test	-.40000	.21354	.04188	-.48625	-.31375	-9.551	25	.000

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Test	.5192	26	.18978	.03722
	Post-Test	.9192	26	.09389	.01841

Conclusions

- This PowerPoint presentation not only helped the students become familiar with Remifentanil pharmacodynamics as a whole but helped them better understand the parturient labor pain and different options that could be used to control labor pain.
- It was clearly evident that the PowerPoint presentation was successful and students were able to retain pertinent knowledge and successfully answer post-test questions.
- In the future, this PowerPoint presentation can be used as a tool by other educators who are interested in incorporating the use of Remifentanil PCA's during labor into their own clinical practice, thereby increasing the knowledge of other practioners they may come into contact with as well.